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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Vincent Chan

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11/30/2004

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EXAMINER

CHU, CHRIS C

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/886,741

Applicant(s)

CHAN ET AL.

Examiner

Chris C. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2 - 14, 16 - 20, 22 - 42, 44 - 48 and 50 - 60 is/are pending in the application.
- 4a) Of the above claim(s) 7, 10, 14, 19, 22, 26 - 40, 42, 50 - 52 & 55 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2 - 6, 8, 9, 11 - 13, 16 - 18, 20, 23 - 25, 41, 44 - 48, 53, 54, 56 - 58 and 60 is/are allowed.
- 6) ☒ Claim(s) 59 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6/21/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on September 10, 2004 has been received and entered in the case.

Claim Objections

2. Claims 7, 10, 19 and 22 are objected to because of the following informalities:
 - (a) Claims 7 and 10 are objected to depend on cancelled claim 1.
 - (b) Claims 19 and 22 are objected to depend on cancelled claim 15.
 - (c) Claim 7, the amendment for claim 7 filed on 2/28/02 states "(Amended) The device as in Claim 1, wherein the unpackaged semiconductor die is attached to the package module by flip-chip attachment." However, applicant's recent amendment filed on 9/10/04 states "(Withdrawn) The device as in Claim 1, wherein the unpackaged semiconductor die is wire bonded to the package module (which is a duplicated claim of claim 6)." Thus, examiner is not sure claim 7 is amended or not.
 - i) If claim 7 is amended, claim 7 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 6. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

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- ii) The proposed amendment doesn't comply with 37 C.F.R. 1.121 since the claim status identifiers are incorrect (e.g., claim 7 is "currently amended" not "Withdrawn"). A sample amendment document, questions and answers, and other information on the practice are posted on the USPTO website at <http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/moreinfoamdtprac.htm>.

Appropriate correction is required.

Election/Restrictions

3. Applicant's election with traverse of Species III in the reply filed on 9/10/04 is acknowledged. The traversal is on the ground(s) that "since claims 7, 10, 14, 19, 22 and 26 are all dependent from independent claims that are not restricted in this application, the independent claims do not cite evidence that are mutually exclusive from these dependent claims ... applicants request withdrawal of the restriction from at least claims 7, 10, 14, 19, 22 and 26." This is not found persuasive because:

- (a) Contrary to applicant's assertion and as explained in the paragraph two of this Office action, claims 7, 10, 19 and 22 are dependent claims of cancelled claims.
- (b) Office action mailed on 6/18/04 established that the instant application has two Species. Species II is rejoined in Species I. Thus, Species I includes claims 2 - 6, 8, 9, 11 - 13, 16 - 18, 20, 23 - 25, 41, 44 - 48, 53, 54 and 56 - 60. and Species III includes claims 7, 10, 14, 19, 22 and 26.

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- (c) Since the independent claims 56 – 59 are not generic claims. Claims 56 and 57 specifically state following limitation “an **unpackaged semiconductor die directly attached to the package module**, the unpackaged semiconductor die encapsulated onto the package module in a structure having a planar top surface” which is mutually exclusive from Species III in Fig. 9 of the instant application. Thus, the dependent claim 14 to the independent claim 56 and the dependent claim 26 to the independent claim 57 would NOT be rejoined.
- d) Finally, if claims 14 and 26 were rejoined, it would create a 112 2nd issue because claims 56 and 57 (parents) are Species I while claims 14 and 26 are Species III.
- e) For the above reasons, claims 7, 10, 14, 19, 22 and 26 would NOT be rejoined.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanioka in view of Distefano '289.

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Regarding claim 59, Tanioka discloses in Figs. 2A - 2C a multi-die module, comprising:

- a substrate (19) having a first surface;
- an unpackaged semiconductor die (2) mounted to the first surface of the substrate, the semiconductor die encapsulated (16) in a structure; and
- a packaged semiconductor die (17) mounted on the first surface of the substrate.

Tanioka does not disclose the encapsulating structure being further comprised of an encapsulating material of a metal cap. However, Distefano discloses in Fig. 2 and column 4, line 21 - 33 an encapsulating structure being further comprised of an encapsulating material of a metal cap (20). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Tanioka by using the metal cap as taught by Distefano. The ordinary artisan would have been motivated to modify Tanioka in the manner described above for at least the purpose of providing a thermal spreader (column 1, lines 45 - 50).

Allowable Subject Matter

6. Claims 2 - 6, 8, 9, 11 - 13, 16 - 18, 20, 23 - 25, 41, 44 - 48, 53, 54 and 56 - 60 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art of record does not teach or reasonably suggest, either singularly or in combination, at least the term "of equal". Tanioka (U. S. Pat. No. 5,784,264) discloses a

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package module having an unpackaged semiconductor die encapsulated onto the package module with a planar top surface and a packaged semiconductor die onto the package module. However, Tanioka does not disclose the planar top surface of the encapsulated structure and the top surface of the packaged semiconductor die being "of equal" distance from the substrate.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

7. Applicant's arguments filed September 10, 2004 have been fully considered but they are not persuasive.

On page 31, applicant argues "neither Tanioka nor Distefano either in combination nor individually disclose, teach or suggest, claim 59's language including, inter alia, '... an unpackaged semiconductor die ... encapsulated in a structure; and a packaged semiconductor die mounted on the first surface of the substrate wherein the encapsulating structure is further comprised of an encapsulating material of a metal cap.' Further, Tanioka and Distefano either in combination or individually fail to disclose, teach or suggest the subject matter of claim 59 as a whole." This argument is not persuasive. Tanioka and Distefano disclose in Fig. 2A an unpackaged semiconductor die (2) ... encapsulated in a structure; and a packaged semiconductor die (17) mounted on the

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first surface of the substrate wherein the encapsulating structure is further comprised of an encapsulating material of a metal cap (see paragraph four of this Office action).

In response to applicant's argument that flanges on the metal cap of the encapsulating material would impermissibly interfere with the unpackaged semiconductor and therefore increase the surface area of the module, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Furthermore, applicant's argument "flanges on the metal cap of the encapsulating material would impermissibly interface with the unpackaged semiconductor and, therefore, increase the surface area of the module. As a result, the suggestion to modify Tanioka with DiStefano would impermissibly change the principle of operation of Tanioka." Such argument is not persuasive because attorney argument is not evidence unless it is an admission. In other words, applicant does not provide any evidence that shows the flanges on the metal cap of DiStefano would impermissibly change the principle of operation of Tanioka or not. Thus, the combination of Tanioka and DiStefano are proper, therefore, the Office action establishes a prima facie case of obviousness for independent claim 59.

For the above reasons, the rejection is maintained.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is 571-272-1724. The examiner can normally be reached on 11:30 - 8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 517-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>.


Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Chris C. Chu
Examiner
Art Unit 2815

c.c.

Tuesday, November 23, 2004


GEORGE ECKERT
PRIMARY EXAMINER